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Floods and the Farmer

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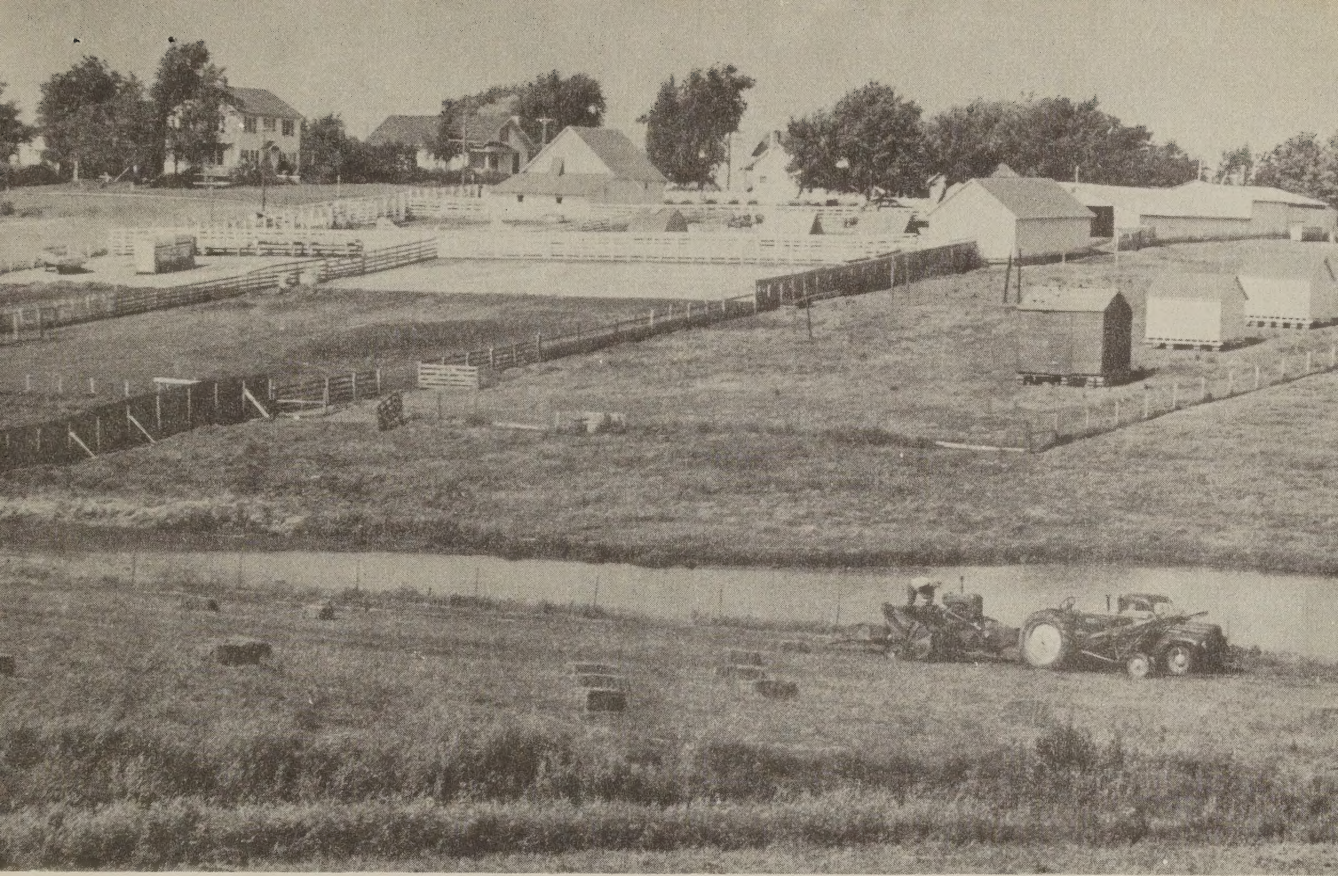


Soil Conservation Service

U. S. Department Of Agriculture

Upper Mississippi Region

Milwaukee, Wis.



Much of the agricultural wealth of the Missouri basin originates in the feed lots of basin farms such as this one located in Page County, Iowa.

By C. W. GEE, *Information Specialist*

AN INLAND EMPIRE

A huge, inland empire, equal in land area to the combined countries of France and Spain: this is the Missouri River Basin. From the tree-carpeted slopes of the Continental Divide, the muddy Missouri slashes down across 10 states to dump its annual load of silt and flood waters into the Mississippi near St. Louis.

Floods are not strange to either the basin or its people. They are all too frequent and each torrent which rolls down the Missouri, deposits new sediment in municipal reservoirs, drainage ditches and the channels of navigation. Each leaves in its wake a story of crop loss, damage to river towns; even loss of life.

Best estimates have set the basin's annual flood bill at \$148,000,000. Significantly, nearly \$80,000,000 of this figure represents damage which seldom attracts much public attention; crop loss and damage to some of the country's best farm land.

Small wonder that so much of the flood bill is represented by agricultural damage for 97 percent of the basin's land area lies outside the mainstem river valleys. This is the land on the tributary streams and upper watersheds. And

92 percent of the people live on the upper reaches of the Missouri's many tributaries.

Many competent observers agree today that the thousands of farmers who manage the privately owned lands draining into the basin, hold in their hands the key to success or failure of any flood control program the government may undertake.

Because of the vast spaces it covers, the Missouri basin poses agricultural problems as varied as its climate and topography. One area, typical of land conditions to be found in the midwestern sector, stretches across the west end of Iowa.

Here the muddy fingers of the Missouri trace a drainage pattern back across 17,000 square miles of Iowa farm land. This area ranges from the Rock River in the north to the Nodaway in southern Iowa.

Most of this country is rolling land and much of it is steep. Predominately, the soils are of wind-blown or loessial origin. These are highly productive but also, highly erodible. This circumstance furnishes the clue to the most prevalent problem of the western Iowa farmer — the ever-present problem of water erosion.

Although this part of the Missouri basin is a general farming area it produces a great deal of



An estimated 75 percent of all flood damage occurs on the farms of the upper watersheds. From eroded fields silt finds its way to the Missouri.

corn and livestock. And, to support such an economy, western Iowa farmers are forced to cultivate thousands of acres of sloping land which is highly vulnerable to water erosion.

As a consequence, huge amounts of topsoil have washed off the slopes of western Iowa to clog drainage ditches in the bottom lands, filling in stream beds and reducing their capacity to carry away flood waters. And, in many localities, intensive farming has been forced to retreat before a spreading network of gullies.

Fully a generation ago, the people of western Iowa were awakening to the fact that their agricultural future was being jeopardized by the same rains which grew their crops. But definite knowledge of how this problem could be most effectively solved was largely lacking prior to 1931 when the Soil Conservation Experiment Station was established near Clarinda in the Missouri Valley loess region. Little, if any, effective research had been done on soil erosion in that part of the country prior to 1931.

The Page County Station was one of the 10 original experiment stations established under a Congressional act of 1928. These were forerunners of the present Soil Conservation Service.

The people in that part of western Iowa wanted the Page County station and were willing to support it. As evidence, the state agricultural experiment station of Iowa leased a 200-acre farm as a site for this new federal investigation into erosion control. The Page County Farm Bureau and Chamber of Commerce in both Clarinda and Shenandoah even agreed to pay taxes on the land.

Viewing the results from 20 years of painstaking research into their own soil and water problems, these people today are convinced the effort was well justified. For the experiments at Clarinda have largely furnished the answer to problems which have plagued several generations of west Iowa farmers.

For example, these experiments have proved that land of a type common throughout the area, was losing about 40 tons of soil an acre annually under continuous corn. But soil losses could be whittled down to 11 tons by merely adopting a three year rotation of corn, small grains and meadow. And when the same sloping land was kept in grass, soil losses dwindled to a mere 0.3 tons.

As to runoff from Iowa's drenching rains, these and later experiments have been equally



This scene is a familiar one to many towns along the Missouri basin. The picture was taken in Red Oak, Ia., during the flood which struck in 1947.

illuminating. One experiment proved a good pasture was capable of soaking up a half inch more rain every hour than corn land. And under controlled conditions, runoff from meadow amounted to only 1.4 inches to 7.5 inches from corn.

By 1940 when the farmers of western Iowa began organizing their own soil conservation districts, a convincing array of information on erosion control had been amassed from experiments at Clarinda and other stations.

West Iowa led the rest of the state in organizing soil conservation districts for which the Soil Conservation Service furnishes trained technicians. Farmers in districts also obtained help from Production and Marketing Administration, Iowa State Experiment Station, Iowa Agricultural Extension Service, State Soil Conservation Committee and other State and federal agencies. Using the educational, technical and financial help of these groups, soil conservation districts were well advanced as the community watershed effort began to evolve.

Many conservationists in western Iowa had contended that the first important work in flood control should be done in the headwaters of smaller streams in order to make downstream

reservoirs more effective and prolong their usefulness.

They pointed out that the flood problem of the mighty Missouri is not one but the sum total of the land use problems visited upon all of its myriad tributaries. The floods on Mule Creek in Mills County form part of the Missouri River problem and so do the freshets which come down Johnson Run at Shenandoah.

JOHNSON RUN BEHAVES

Johnson Run has been described as a little creek with a big frustration.

The frustration developed years ago when D. S. Priest, a pioneer builder in Shenandoah, decided to change the rambling creek channel in order to straighten a street and open a new sub-division. He threw a dike across a bend in the creek and put in a diversion channel. Houses now stand in what was once the old creek bed.

As Henry Read, Shenandoah attorney and long time resident expresses it: "Johnson Run has been trying to get back to its old channel ever since."

The creek, a small one, is typical of the community watersheds which affect municipalities.



A placid little creek is Johnson Run which skirts Shenandoah, Ia., yet it has caused damage estimated at \$200,000. Watershed covers 1,230 acres.

Johnson Run rises in the hilly land southeast of Shenandoah and flows down across the southern part of the city to join a larger drainageway. The watershed is only two and a quarter miles long and totals 1,230 acres, of which 254 lie within the residential area of Shenandoah.

More than two-thirds of the area outside the limits is owned and operated by commercial nurseries. These are the Earl May Seed Company, the Henry Field Seed Company, and the Shenandoah Nursery.

Floods on Johnson Run have not been frequent, but as one citizen expressed it, "When we had one it was a dandy." Frederick Fischer, retired municipal judge who moved to Shenandoah as a boy in 1881, remembers most of them.

"There is a fall of about 13 feet in a distance of 10 blocks from the creek down to the business district," he explained. "I recall particularly the flood of 1924 when the creek came out of its banks and poured into town.

"At that time Elm Street was paved with wooden blocks from Sheridan to the creek. The water got under the pavement and all of our blocks floated away. We replaced them with brick."

This was one of four floods which have struck

Shenandoah since the turn of the century. As Henry Read recalls, these occurred in 1902, 1915 which was the one that took out the railroad tracks, 1924 and 1933.

A five and a half-inch cloudburst which fell in two hours caused the flood of June 27, 1933. Damage was heavy. The Shenandoah Nursery alone had a loss of thousands of dollars.

For 25 years prior to 1933, from five to seven acres of nursery land lying outside the city limits, was flooded two years out of every seven. Damage to irrigation equipment and nursery crops has been estimated at \$2,000 an acre. And in Shenandoah proper, city officials have estimated flood damages during this same period as high as \$200,000.

But things have been happening on Johnson Run since 1933, and the Page County Soil Conservation District has had a hand in these developments.

Joseph A. Abrahamson, who is farm manager at the Mount Arbor Nursery, started the ball rolling about 1943 when he asked the soil conservation district to help him develop a soil and water conservation program on his company's 1,800 acres.

Although Mount Arbor land is on nearby Four



Residents of Shenandoah believe that soil conservation work applied by nurseries on the Johnson Run watershed has solved the flooding problem.

Mile Creek rather than Johnson Run, the problems on the two watersheds were almost identical. From this beginning, much has come. Another nursery filed a similar request with the district a few months later, and today every acre of nursery land on the watershed is being operated under a soil and water conservation program. Everything is on the contour, soil fertility is being maintained and more than 26 miles of level terraces have been constructed.

"There is no doubt this program has helped," said Henry Read. "We haven't had a flood on Johnson Run since the work was done. If a three-inch rain fell up there in two hours, I don't know what would happen but I believe we're protected from anything short of a cloudburst."

Both K. D. Holmes, vice-president of the Shenandoah Nursery, and C. F. Clarke, president of the Chamber of Commerce, are inclined to agree with Read's opinion.

"Our basement at home was filled in the flood of 1933," Mr. Holmes said, "and water stood three or four feet deep all over the yard. We were in bed when it hit us, about 11 o' clock at night."

Said the Chamber of Commerce president, "I feel like Johnson Run is under control. We don't

even worry about it anymore."

This attitude, however, represents only the opinions of laymen who do not profess to be expert observers. Several of them called attention to the fact that intensity, and soil conditions at the time of rainfall, have much to do with the amount of runoff. Also, the Marshall silt loam which predominates on Johnson Run is a highly permeable soil and takes up water more rapidly than many other soil types. Hence, the level terraces. Other soil conditions might prevail on other watersheds.

There are no rain gauges on the upper watershed of Johnson Run but there is an official gauge located in Shenandoah at the foot of the creek. This is only a couple of miles from the stream's origin.

During the June floods of 1947, the nearby Nishnabotna River reached an all time high. Johnson Run flowed serenely to its mouth, no more than two-thirds full.

On May 1, 1951, the Shenandoah gauge recorded 2.41 inches of rainfall between 4:30 p.m. and 7:00 a.m. Johnson Run did not become half full.

On May 8, 1950, the Shenandoah gauge recorded 5.11 inches of rain in a 24-hour period.



This aerial photo shows the countryside north and east of Tabor, Ia., in 1938. Poor drainage is indicated by wet spots. Note evidence of gullying.

From 6:30 p.m. until 10:30 p.m. four inches of rain fell; an average of an inch an hour. Johnson Run remained well below bank full stage.

Such evidence might not satisfy a flood expert or a research man but it satisfies the citizens of Shenandoah who watch the rain fall and do not worry.

But this is only one community watershed on which farmers are making their contribution to flood control. There are many such throughout western Iowa and notable among these is Mule Creek in Mills County.

MULE CREEK PROGRAM OPENS

An event, which may prove to be a new milestone in the history of Mule Creek, took place at the office of the Mills County Soil Conservation District in Malvern, October 6, 1949. On that date the farmers met to organize a formal watershed association and elect officers. This is said to be the first such organization to come into existence on any tributary of the Nishna-botna.

The Mule Creek watershed is made up of 62 farms totaling 10,445 acres. It drains an area

six miles long and somewhat over two miles wide, located a few miles southwest of Malvern.

Like its barnyard namesake, Mule Creek is contrary. It drains some of west Iowa's best farm land, 98 percent of the entire area being suitable for cultivation. But it sends tons of soil on down to the Missouri each spring from the sloping cornfields and from its own caving banks.

On the day the watershed association was formed, Harold A. McCain was elected chairman; Corte K. Stewart was elected secretary, and three directors were elected. They are Harold Grindle, Edwin Seeger and Frank Chamberlain. All of these farmers live on Mule Creek and were already cooperators with the Mills County Soil Conservation District.

At that time, only 12 farmers on the watershed had developed complete soil conservation plans. The district had applications for similar assistance from 33 other farmers but the rest had made no move in the direction of soil and water conservation other than a few scattered practices such as terracing or check dams.

Although the association has been at work less than two years, its members today believe they have the watershed 25 to 30 percent pro-



What a soil conservation district program can do for farmland is shown in this 1950 photo. Aerial covers the same area shown on opposite page.

tected.

There are now 34 farmers with complete farm conservation plans and a third of the program planned by them is already applied on the land. Fifteen other farmers have starting plans. Hence, 79 percent of all the watershed farms are under complete or starting plans in less than two years of association activity.

A land use inventory of the watershed reveals that 40 percent of the area, or approximately 4,000 acres, was originally in need of terracing. In the past five years 122 miles of terraces have been built and 184 additional miles have been planned. So of the original terrace needs, 282 miles must still be constructed.

Ray W. Jones, farm planner for the SCS in Mills County, estimates 25 percent of the terracing has been done and 30 percent of the needed rotations have been developed.

"It will take about 10 more years to get that watershed up in top shape," he said. "The association hasn't attempted to put the heat on anyone. They have talked up the program and explained their own plans to other farmers, letting nature take its course. After all, this is the wiser way. If a change were made too rapidly it could upset the economy of the entire area."

J. F. Wearin, Jr., chairman of the Mills district board, agrees with this philosophy and views the watershed association as a forward step for the area.

"There's a lot to be said for the contribution the right kind of farming can make to flood control," he said. "There's no question but that it can reduce runoff and soil loss. Terraces alone won't do the job, however. You need good rotations and proper land use over most of the watershed.

"I think with 75 percent application of soil and water conserving measures on the entire watershed there would be a big difference in the amount of water and sediment going down the main rivers."

Harold A. McCain, chairman of the watershed association, operates 520 acres of land bordering Mule Creek. McCain has a complete program developed for his farm, has built 10 miles of terraces, and will build five more.

"We are just getting started," he said, "but I'm sure I can already see a difference in the amount of silt and flood water going past my place. I believe if enough smaller watersheds get organized and get a program developed the farmers can make an important contribution to



This is a recent photograph of the Mule Creek watershed. It is located in Mills county and drains 10,445 acres of Iowa's rich, rolling farmland.

main valley flood control. And as far as my personal interest goes, soil conservation has increased the income on my own farm 40 percent."

Brice L. Hays, who farms 1,150 acres of land downstream from McCain, also believes he has noticed a reduction in the amount of water coming down from the hills and in the silt load carried by Mule Creek. "The creek doesn't come up as fast as it used to," he said.

Corte K. Stewart, who farms 160 acres nearby, agrees that an improvement is already noticeable though much remains to be done. "This 160-acre farm had a corn base of 140 acres when I bought it in 1940," Stewart said. "By last year I had it cut to 73 acres but I put just as much corn in the bin as I used to get from 140."

Although not formally organized, there are numerous other small watersheds in this Iowa section of the Missouri basin. On these, farmers are actively at work increasing their private incomes and contributing their measure to flood control through better land use.

In these four soil conservation districts alone, the farmers in less than 10 years have built more than 6,000 miles of terraces; enough to reach from New York to San Fran-

cisco and back. There are only five SCS farm planners in the four districts, but last year they wrote 319 farm plans, each one based on a detailed land use map and each tailored to fit that particular farm. And in these four districts, 931 other farmers have their written applications on file with the soil conservation districts, asking for the same kind of technical assistance.

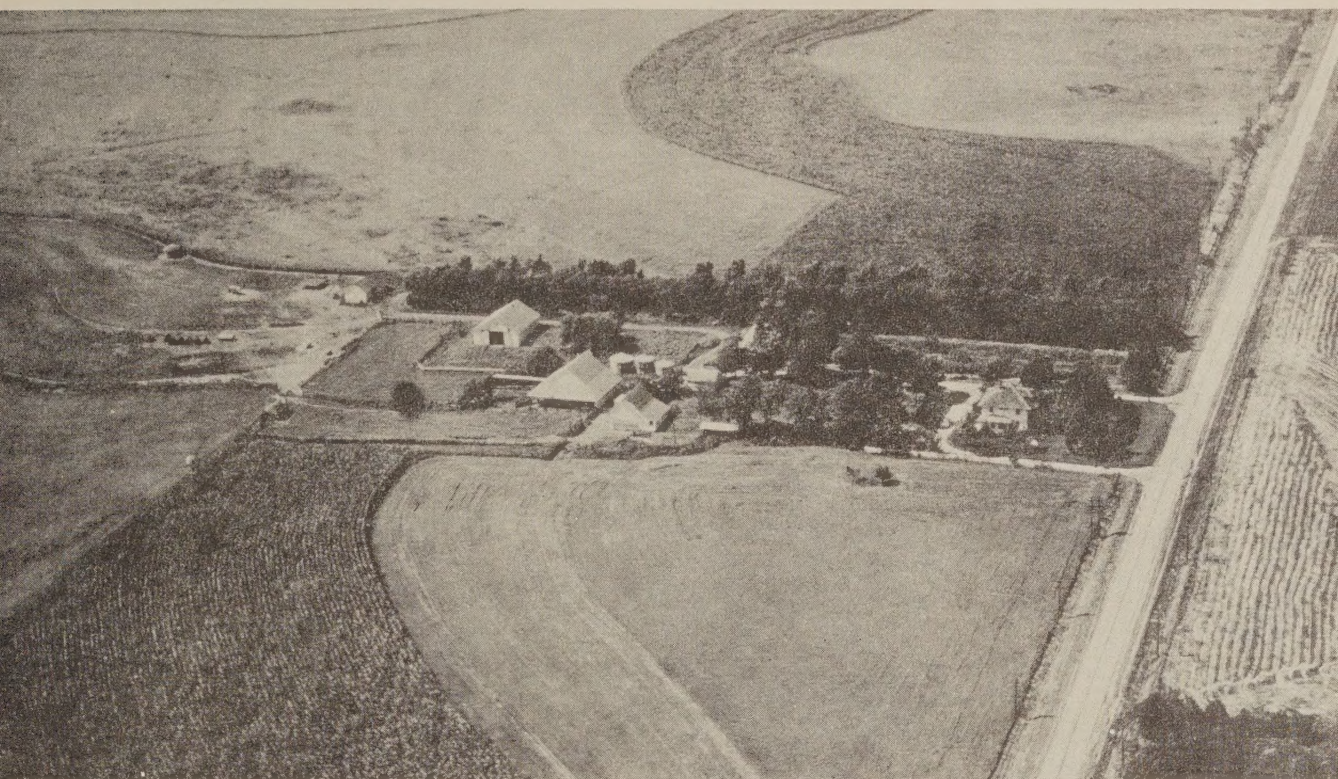
The majority of these farmers do not yet think in terms of belonging to any particular watershed, although geographically they cannot escape it. For every piece of land in that country drains into some natural watercourse.

In studying a water policy for the American people, the President's Water Resources Policy Commission observed, "The practical-sized watershed is one on which the residents are willing to spend time, money and energy because they regard it as their own. It is an area with which they associate their pasts, and particularly their personal futures."

West Iowa, though only a small part of the huge Missouri River basin, holds many such watersheds. In only a few throughout the area have farmers and their government teamworkers really started to whip their land

problems and fully develop the watershed resources. A tremendous job lies ahead. Experience of recent years points the way. The

people of western Iowa feel that with the right kind of land use their personal futures can be much brighter.



Contour cultivation and terracing have brought marked benefits to many west Iowa farms. Above is the Frank Buffington home west of Malvern, Ia.



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